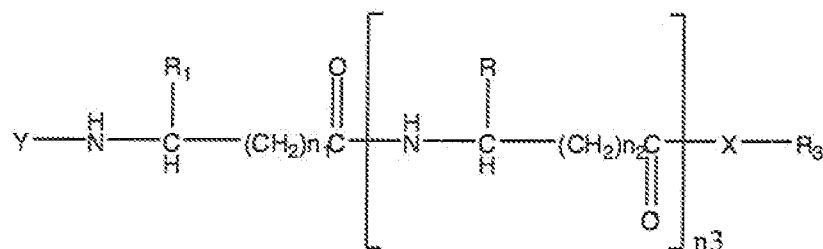


## Amendments to the Claims

1-59 (Canceled)

60. (New) A water-soluble thioester or selenoester compound of the formula:



wherein Y is selected from the group consisting of: an amino acid, a peptide, and a polypeptide;

X is sulfur or selenium;

$n_1$  and  $n_2$  are each from 0 to 2, and  $n_3$  is from 0 to 100;

R and  $\text{R}_1$  are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

$\text{R}_3$  is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of:  $-\text{[C(O)}-\phi-\text{C(O)}-\text{NH}-\psi-\text{NH}]_{n_5}$  and  $-\text{[NH}-\psi-\text{NH}-\text{C(O)}-\phi-\text{C(O)}]_{n_5}$ , where  $n_5$  is an integer from 2 to 100, and  $\phi$  and  $\psi$  are divalent radicals that may be the same or different and are selected from the group consisting of  $-(\text{CH}_2)_{n_6}-(\text{CH}_2\text{CH}_2\text{O})_{n_7}-(\text{CH}_2)_{n_6}-$  and  $-((\text{CH}_2)_{n_6}-(\text{O}-\text{CH}_2-\text{CH}_2)_{n_7}-(\text{CH}_2)_{n_6})-$ , where  $n_6$  is an integer from 1 to 6 and  $n_7$  is an integer from 2-50.

61. (New) The thioester or selenoester compound according to claim 60 wherein Y is a peptide or polypeptide.

62. (New) The thioester or selenoester compound according to claim 61 wherein said peptide or polypeptide comprises protected amino acids.

63. (New) The thioester or selenoester compound according to claim 61 wherein said Y contains an N-terminal amino acid containing a group that supports chemical ligation.

64. (New) The thioester or selenoester compound according to claim 60 wherein

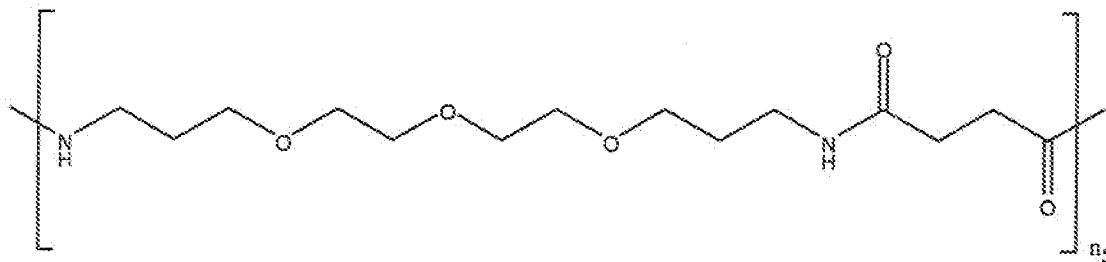
$R_3$  comprises a group of the formula  $-C(R_7)(R_8)-U$ -Polymer, where

$R_7$  and  $R_8$  are each individually selected from the group consisting of: hydrogen or linear, branched, substituted, or unsubstituted alkyl, aryl, heteroaryl, and benzyl, and

U is selected from the group consisting of alkyl, aryl, heteroalkyl, heteroaryl, alkoxy, of up to 18 carbon atoms, and

Polymer is selected from the group consisting of:  $-[C(O)-\phi-C(O)-NH-\psi-NH]_{n_5}$  and  $-[NH-\psi-NH-C(O)-\phi-C(O)]_{n_5}$ , where  $n_5$  is an integer from 1 to 100, and  $\phi$  and  $\psi$  are divalent radicals selected from the group consisting of  $-((CH_2)_{n_6}-(CH_2CH_2O)_{n_7}-(CH_2)_{n_6})-$  and  $-((CH_2)_{n_6}-(O-CH_2-CH_2)_{n_7}-(CH_2)_{n_6})-$ , where  $n_6$  is an integer from 1 to 6 and  $n_7$  is an integer from 2-50.

65. (New) The thioester or selenoester compound of claim 64 wherein Polymer comprises a divalent radical of having the structure:



where  $n_5$  is an integer of from 2 to 12.

66. (New) The thioester or selenoester compound of claim 64 wherein

$\phi$  is  $-(CH_2-CH_2)-$  and  $\psi$  is  $-(CH_2-(CH_2-CH_2-O)_3-CH_2-CH_2-CH_2)-$  or  $-(CH_2-CH_2-CH_2-(O-CH_2-CH_2)_3-CH_2)-$ .

67. (New) The thioester or selenoester compound of claim 60 wherein R is a group of the structure  $-C(R_4)(R_5)(R_6)$ ,

where  $R_4$ ,  $R_5$ , and  $R_6$  each individually are selected from the group consisting of: hydrogen, linear, branched, substituted or unsubstituted alkyl, aryl, heteroaryl, and benzyl.

68. (New) The thioester or selenoester compound of claim 64 wherein

Y is a peptide or polypeptide;

X is sulfur;

$n_1$  and  $n_2$  are 0;

$R_7$  and  $R_8$  are each individually selected from the group consisting of: hydrogen,  $-\text{CH}_3$ , and  $-\text{CH}(\text{CH}_3)_2$ .

69. (New) The thioester or selenoester compound of claim 68 wherein:

$n_3$  is from 2 to 50,  $n_4$  is from 1 to 3,  $n_7$  is from 2 to 5; and

$\phi$  is  $-(\text{CH}_2-\text{CH}_2)-$  and  $\psi$  is  $-(\text{CH}_2-(\text{CH}_2-\text{CH}_2-\text{O})_3-\text{CH}_2-\text{CH}_2-\text{CH}_2)-$  or  $-(\text{CH}_2-\text{CH}_2-\text{CH}_2-(\text{O}-\text{CH}_2-\text{CH})_3-\text{CH}_2)-$ .

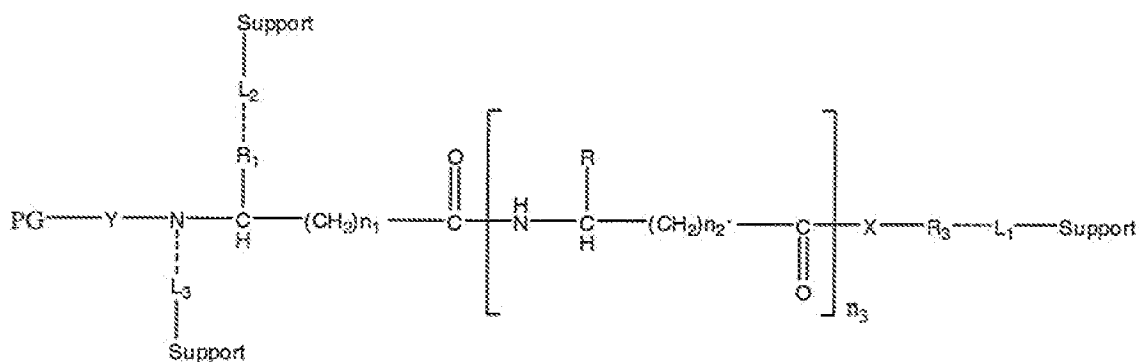
70. (New) The thioester or selenoester compound of claim 60 wherein Y comprises an N-terminal group that supports chemical ligation.

71. (New) The thioester or selenoester compound of claim 70 wherein the N-terminal group comprises cysteine or selenocysteine.

72. (New) The thioester or selenoester compound of claim 71 wherein the cysteine or selenocysteine is protected.

73. (New) A method of cleaving a thioester or selenoester compound from a solid support, said method comprising:

providing a thioester or selenoester generator having the formula:



wherein PG is a protecting group that may be present or absent,

Y is an amino acid, a peptide, or a polypeptide and may be present or absent, and when Y is absent PG is an amino protecting group that may be present or absent;

R and R<sub>1</sub> are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

R<sub>3</sub> is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of: -[C(O)-φ-C(O)-NH-ψ-NH]<sub>n<sub>5</sub></sub> and -[NH-ψ-NH-C(O)-φ-C(O)]<sub>n<sub>5</sub></sub>, where n<sub>5</sub> is an integer from 2 to 100, and φ and ψ are divalent radicals that may be the same or different and are selected from the group consisting of -((CH<sub>2</sub>)<sub>n<sub>6</sub></sub>-(CH<sub>2</sub>CH<sub>2</sub>O)<sub>n<sub>7</sub></sub>-(CH<sub>2</sub>)<sub>n<sub>6</sub></sub>)- and -((CH<sub>2</sub>)<sub>n<sub>6</sub></sub>-(O-CH<sub>2</sub>-CH<sub>2</sub>)<sub>n<sub>7</sub></sub>-(CH<sub>2</sub>)<sub>n<sub>6</sub></sub>)-, where n<sub>6</sub> is an integer from 1 to 6 and n<sub>7</sub> is an integer from 2-50.

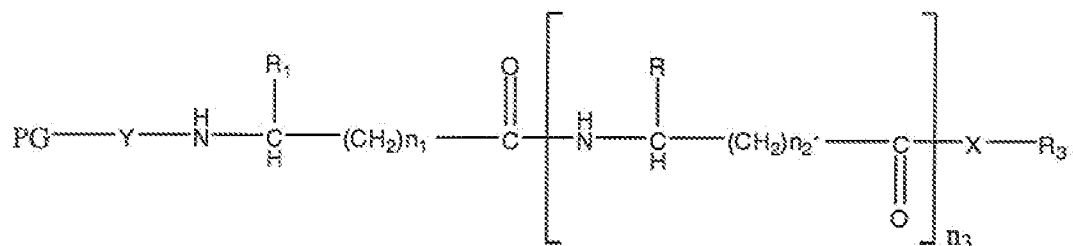
X is sulfur or selenium;

n<sub>1</sub> and n<sub>2</sub> each are from 0 to 2; n<sub>3</sub> is from 0 to 100;

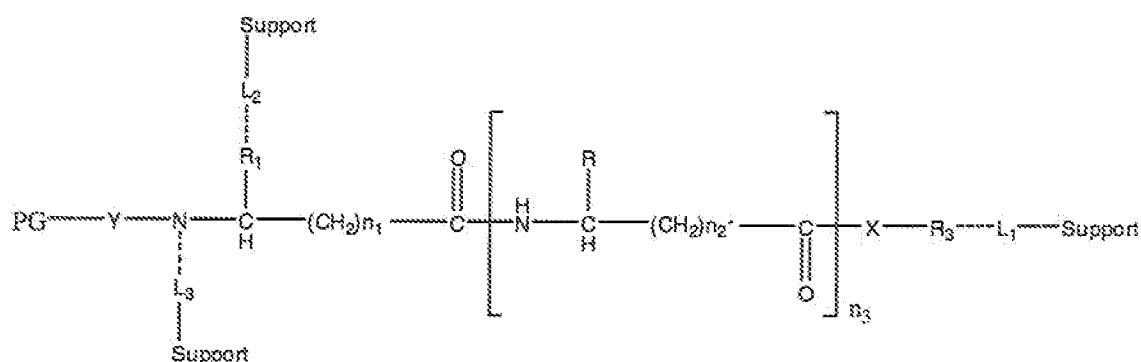
each L<sub>1</sub>, L<sub>2</sub> and L<sub>3</sub> is a linker cleavable under non-nucleophilic conditions wherein only one of L<sub>1</sub>, L<sub>2</sub>, and L<sub>3</sub> is present;

Support is a solid phase, matrix or surface; and

(b) cleaving said linker under non-nucleophilic conditions to generate a thioester or selenoester compound comprising the formula:



74. (New) A thioester or selenoester generator comprising a composition having the formula:



wherein PG is a protecting group that may be present or absent,

Y is an amino acid, a peptide, or a polypeptide and may be present or absent, and when Y is absent PG is an amino protecting group that may be present or absent;

R and R<sub>1</sub> are individually selected from the group consisting of: hydrogen, a side chain of an amino acid, a branched alkane, a cycloalkane, an alkyl-substituted aryl or heteroaryl group, and combinations thereof;

R<sub>3</sub> is a group compatible with a thioester or selenoester and comprises a water-soluble polymer of a formula selected from the group consisting of:  $-\text{[C(O)}-\phi-\text{C(O)-NH-}\psi\text{-NH]}_{n_5}$  and  $-\text{[NH-}\psi\text{-NH-C(O)-}\phi\text{-C(O)]}_{n_5}$ , where n<sub>5</sub> is an integer from 2 to 100, and  $\phi$  and  $\psi$  are divalent radicals that may be the same or different and are selected from the group consisting of -

$((\text{CH}_2)_{n_6}-(\text{CH}_2\text{CH}_2\text{O})_{n_7}-(\text{CH}_2)_{n_6})-$  and  $-(\text{CH}_2)_{n_6}-(\text{O}-\text{CH}_2-\text{CH}_2)_{n_7}-(\text{CH}_2)_{n_6}-$ , where  $n_6$  is an integer from 1 to 6 and  $n_7$  is an integer from 2-50.

X is sulfur or selenium;

$n_1$  and  $n_2$  each are from 0 to 2;  $n_3$  is from 0 to 100;

each  $L_1$ ,  $L_2$  and  $L_3$  is a linker cleavable under non-nucleophilic conditions wherein only one of  $L_1$ ,  $L_2$ , and  $L_3$  is present;

Support is a solid phase, matrix or surface.